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# Chen Northern, Inc.

FINAL

HEALTH AND SAFETY PLAN

HUGHESVILLE MINING DISTRICT  
GALENA CREEK DRAINAGE BASIN  
REMOVAL SITE INVESTIGATION  
PRELIMINARY ASSESSMENT

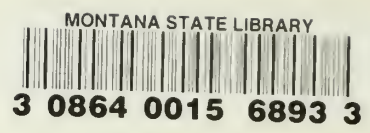
JUDITH BASIN COUNTY, MONTANA

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PRELIMINARY ASSESSMENT**

**JUDITH BASIN COUNTY, MONTANA**

Prepared for:

Montana Department of State Lands  
Abandoned Mine Reclamation Bureau  
Helena, Montana

Prepared by:

Chen-Northern, Inc.  
Helena, Montana

November, 1990

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**CHEN-NORTHERN INC.  
HEALTH AND SAFETY PLAN  
Preliminary Assessment  
Hughesville Mining District**

**I. GENERAL INFORMATION**

CLIENT:	Montana Department of State Lands (DSL) Abandoned Mine Reclamation Bureau (AMRB)
PROJECT MANAGER:	Myles Grotbo
SITE NAME:	Hughesville Mining District
SITE LOCATION:	Cascade and Judith Basin Counties, 10 miles east of Monarch, MT.
PURPOSE OF FIELD VISIT:	Surface water sampling, stream flow measurements, monitoring well installation, ground water sampling, soil sampling
DATE OF VISIT(S):	Beginning June 15, 1990 though June 1, 1991
BACKGROUND INFORMATION:	Complete: Preliminary: X
INFORMATION AVAILABLE FROM:	Chen-Northern, Inc., Helena, MT
OVERALL HAZARD SUMMARY:	Serious: Moderate: Low: X

**II. SITE CHARACTERISTICS**

SITE DESCRIPTION (site map attached)

The Hughesville Mining District is located in north-central Montana within the Lewis and Clark National Forest approximately 10 miles east of Monarch. Hughesville is situated within the Galena Creek drainage, a tributary to the Dry Fork Belt Creek.





Mining and milling activities in the district have resulted in deposited wastes along the Galena and Dry Fork Belt Creek drainages. Exposed tailings material is present in the area, and is contained behind impoundments or dispersed over adjacent areas. Acid mine discharge originates in numerous mine adits and shafts and impact water quality in these drainages.

PRINCIPAL DISPOSAL METHOD (type and location): Mine dumps, tailings dams and fluvial deposition.

Mining wastes were deposited in dumps, tailings ponds, and in the Galena and Dry Fork Belt Creek stream channels and floodplains.

FEATURES (water supply, telephone, radio, power lines, gas lines, water mains, terrain, etc.):

Historical mine buildings; mine waste dumps are located on steep slopes.

STATUS (active, inactive, unknown):

Inactive mining area.

HISTORY (worker or non-worker injury; complaints from public; previous agency action):

Silver-lead mining in the Hughesville mining district began in 1879. Numerous inactive mines, mine waste dumps, and a mill site with two large tailings ponds impact four miles of the Galena Creek drainage and a ten mile reach of the Dry Fork Belt Creek, below Galena Creek.

Galena Creek and a portion of Dry Fork Belt Creek downstream of Galena Creek do not support aquatic life as a result of historic mining. Water quality is significantly degraded by acid mine discharge from abandoned mine shafts and adits, leachate from mine/mill waste and tailings dumps, and erosion of mine waste from disturbed areas. Wind erosion of the unvegetated mill tailings are a safety hazard to local residents, livestock, and wildlife.



Previous environmental investigations at the Hughesville site include two studies completed by the Montana Department of Natural Resources and Conservation (DNRC) and an investigation performed by DSL/AMRB to fund tailings reclamation through a DNRC Resource Indemnity Trust Grant. The purpose of these three investigations was to evaluate water quality degradation in the Galena Creek drainage and to develop potential remediations for identified water quality problems. In addition to these studies, DSL/AMRB completed an inventory of all mining related disturbances in the district.

Ms. Gwen McBride, a local resident, does not consume water from her domestic well because the water has a metallic taste and large amounts of iron. She has also expressed concern over erosion of metal enriched tailings material contained in the Block P tailings ponds which has been impacting the watershed since the mill ceased operation in 1943.

### III. WASTE CHARACTERISTICS

#### WASTE TYPE(S):

Liquid \_\_\_\_\_ Solid   X   Sludge \_\_\_\_\_ Gas \_\_\_\_\_

#### CHARACTERISTICS:

Corrosive   X   Ignitable \_\_\_\_\_ Radioactive \_\_\_\_\_  
Volatile \_\_\_\_ Toxic   X   Reactive \_\_\_\_ Unknown \_\_\_\_ Other (Name) \_\_\_\_

### IV. HAZARD EVALUATION - All Site Activities

#### Overall Hazard Level:

Low. Potential hazards are minimized by the relatively short duration of the planned site activity and the minimal amount of site disturbance planned. Review



of surface water results from previous sampling episodes indicate relatively low overall levels of contamination in the Hughesville Mining District.

#### Chemical Hazards:

Metals present at the Hughesville site which are believed to exceed natural background levels are arsenic, cadmium, chromium, iron, zinc, copper, and lead. Concentrations of these metals in surface water are generally less than proposed Recommended Maximum Contaminant Levels (RMCL's) by the USEPA or Draft drinking water health advisories from the USEPA. Occasional exceedances are possible during periods of high discharge or in water flowing from adits and shafts. Concentrations of metals in groundwater generally exceed RMCL's. Concentration of metals suggest minimal occupational health hazards to workers if the water is not ingested and prolonged dermal contact is avoided.

Maximum concentrations of metals detected in surface water during previous investigations performed by DNRC are:

<u>Metal</u>	<u>Concentration (mg/l)</u>
Arsenic	0.5
Cadmium	0.7
Chromium	not measured
Copper	5.0
Iron	336
Lead	0.3
Zinc	396

Metal concentrations in buried soil and sediment along the Galena and Dry Fork Belt Creek are unknown. No previous testing has taken place. Generally, higher than normal metals concentrations in exposed and buried soils and sediment pose minimal occupational hazards to workers if not ingested and prolonged dermal contact is avoided.





Below is a brief overview of the health hazards of the major toxic metals found in the Hughesville Mining District.

Arsenic is considered a potential carcinogen, particularly of the skin and bronchi. The chief exposure symptoms are dermatitis and irritation of mucus membranes. Other symptoms include weakness, loss of appetite, some nausea, occasional vomiting, a sense of heaviness in the stomach, and diarrhea. A hoarse voice is characteristic of an arsenic worker. The OSHA limit is  $0.01 \text{ mg/m}^3$  and the "Action Level" is  $0.005 \text{ mg/m}^3$ , at which point medical surveillance is required for employees exposed for 30 days or more per year. This OSHA standard is based upon concerns over the carcinogenicity of arsenic.

Cadmium exposures should not exceed an 8 hour average of  $0.05 \text{ mg/m}^3$  and is recommended in order to prevent long-term effects including emphysema, kidney damage, anemia, yellow discoloration of teeth and bone changes. Prostatic and bronchial cancers have been reported among cadmium oxide workers.

Chromium appears in three valence states, with Cr (VI) being the most toxic. It is associated with skin irritation, contact dermatitis, skin ulcers, and nasal irritation. Cr (VI) can be absorbed through the skin and has been shown to cause kidney damage by this absorption route. Inhalation of Cr (VI) has been linked with lung cancer. The divalent and trivalent chromium atoms are less toxic. The Threshold Limit Value (TLV) for Cr (VI) is  $0.05 \text{ mg/m}^3$  and the TLV for the other valence forms is  $0.5 \text{ mg/m}^3$ .

Copper dust and mist exposure should not exceed a time weighted average of  $1.0 \text{ mg/m}^3$  for any 8 hour period. If inhaled, Copper dust or mist is an irritant to the mucous membrane and pharynx.

Iron oxide exposure of hematite miners has caused lung damage, but the miners were also exposed to other lung irritants, including silica and radon. Their lung cancer rates were higher than expected. A TLV of  $5 \text{ mg/m}^3$  has been recommended to prevent lung changes.





Lead exposure may result from inhalation and ingestion, but not dermal absorption. Excessive lead levels are associated with central nervous system effects, degeneration of peripheral nerves, gastrointestinal disturbances, altered spermatogenous, anemia and kidney damage. Symptoms of overexposure may include loss of appetite, metallic taste in the mouth, anxiety, constipation, nausea, pallor, excessive tiredness, weakness, insomnia, headache, nervous irritability, muscle and joint pain or soreness, fine tremors, numbness, dizziness, hyperactivity, abdominal pain, decreased sex drive, impotence, and decreased fertility. Biological monitoring of adult worker blood levels show that these effects may be manifested when blood levels exceed 0.06 mg/100 grams. The TLV for lead is 0.15 mg/m<sup>3</sup>. The OSHA limit for lead exposure is 0.05 mg/m<sup>3</sup>, averaged over an 8-hour work shift.

Zinc dust is classified with the "nuisance dusts" for the purposes of reporting the TLV which is 10 mg/m<sup>3</sup>. It is relatively nontoxic.

Physical Hazards: These are the normal physical hazards of outdoor environmental work and may include rough terrain, adverse weather and wildlife. Physical hazards associated with each work task are presented below following a description of each task. A summary of physical hazards, risks and personal protective equipment associated with each work task is presented in Table 1.

- ♦ Surface Water Sampling and Discharge Measurement - This task will be completed by wading in Galena Creek and Dry Fork of Belt Creek at designated locations.
- ♦ Monitoring Well Installation and Groundwater Sampling - Boreholes will be drilled with an air rotary drill rig.



- ◆ Soil/Mine Waste Sampling - Material samples will be collected using three methods; hard augering, split spoon, and hand trowel. Hazards associated with hand augering and hand trowel include slip and fall hazards (if creeks must be crossed to access a sample site) and steep slopes. Hazards associated with split spoon sampling include those hazards listed for drilling rigs.
- ◆ Stream wading for flow measurement and sampling may have slip and fall hazards along with drowning. Safety measures include the buddy system and a belt to prevent filling up of chest waders.
- ◆ Hazards associated with monitoring well installation include falling objects, high pressure hoses, and other hazards associated with work around drilling equipment. Hard hats, safety glasses, and steel-toed boots, in addition to level D personal protective equipment, will be worn when working around drill rigs.



**PHYSICAL HAZARDS AND PERSONAL PROTECTIVE EQUIPMENT**  
**Preliminary Assessment**  
**Hughesville Mining District, Montana**

<b>TASKS</b>	<b>HAZARDS</b>	<b>RISK</b>	<b>PERSONAL PROTECTIVE EQUIPMENT</b>
Surface Water Sampling (wading)	Splash	Low	Waders, washable clothing appropriate for the weather, rubber gloves, coveralls, (rainsuits or rubber aprons, if appropriate).
Stream Flow Measurement (wading)	Splash	Low	
Ground Water Sampling	Splash	Low	Steel toe neoprene boots, washable clothing appropriate for the weather, rubber gloves, (rain suits or rubber aprons, if appropriate).
Surface Water Sampling (bridge crane)	Splash	Low	
Stream Flow Measurements (bridge crane)	Splash	Low	
Monitoring Well Installation	Splash & Dust	Low	As above with the addition of hardhats and safety glasses.
Soil Sampling	Dust	Low	Neoprene boots or overshoes, washable clothing, rubber gloves, coveralls.



## V. PROCEDURES

### SITE ORGANIZATION:

Map/Sketch Attached YES Site Secured NO  
Perimeter Identified NO Zone(s) of Contamination Identified NO

### SITE-PERSONNEL:

#### TEAM ORGANIZATION

TEAM MEMBER	RESPONSIBILITY
Myles Grotbo	Project Manager
Kathleen Smit	Corporate Safety Officer-Health and Safety Manager
David Hazen	Site Safety Coordinator (SSC)
Pat Bugosh	Document Control Officer
Michael Cormier	Field Sampling Coordinator
Laura Nordahl	Personnel Officer

### Level of Protection -

A \_\_\_\_\_ B \_\_\_\_\_ C X D X

Level D personal safety protective equipment includes the following:

- ♦ Coveralls
- ♦ Boots/Shoes - safety or chemical-resistant steel-toed boots
- ♦ Hard hat (optional, depending on task)





- ♦ Face shield (optional, depending on task)
- ♦ Examination Gloves
- ♦ Rubber Gloves (optional, depending on task)
- ♦ Safety Glasses (optional, depending on task)
- ♦ Ear Protection Equipment (optional, depending on task)

Level C personal protective equipment should be used when visible dust is encountered, when sampling in enclosed areas or when in the same area containing mine processing chemicals. In addition to Level D clothing, Level C equipment includes:

- ♦ Chemical resistant clothing (splash protection optional)
- ♦ Air purifying canister equipped respirator

#### Modifications:

Steel toe neoprene boots, washable clothing appropriate for the weather, rubber gloves whenever there is a potential for contact with soils or water on-site. Bring an extra set of clean clothing.

#### Safety Equipment and Materials:

First aid kit, Eye wash, stretcher or blanket, clean water, paper cups, 2.5 lb. ABC fire extinguisher, wind flag. Equipment shall be suitable for the type of weather conditions anticipated at the site. Additional equipment may include insulated waders, insulated rubber boots, gloves, and hats.



## Safety Procedures:

If chemical barrels or materials are found on site:

- ◆ Leave area and notify Site Safety Officer
- ◆ Chemical barrels or materials will be sampled or removed according to separate health and safety plan.
- ◆ If Site Safety Coordinator (SSC) determines environmental sampling can continue in chemical area, use level C personal protective equipment.

If an injury occurs, take the following steps:

- ◆ Prevent further injury and notify the Site Safety Coordinator.
- ◆ Initiate first aid and get medical attention for the injured immediately.
- ◆ Depending upon the type and severity of the injury, call the occupation physician and/or medical consultant.
- ◆ Notify the Health and Safety Manager.
- ◆ Notify the injured person's Personnel Officer.
- ◆ Prepare an incident report. The SSC is responsible for ensuring its preparation and submittal to the Health and Safety Manager and Personnel Officer within 48 hours.
- ◆ The SSC will assume responsibility during a medical emergency.



If weather related exposures occur, take the following steps:

Cold Exposures --

- Keep truck running during cold weather
- Treat any exposure as necessary
- Be aware of symptoms of frost bite and hypothermia

Warm Exposures --

- Wear protective clothing suitable for the weather
- Be aware of heat stress and heat stroke symptoms

Monitoring Equipment and Action Levels:

Note wind direction and do not remain downwind of areas devoid of vegetation. Avoid areas with visible dust. If dust from tailings area is visible, all personnel must leave the site immediately. This includes areas adjacent to the tailings. If dust is visible and personnel cannot leave the site due to critical operations, Level C personal protection equipment must be used. Air samples should be collected to determine personal exposure to metals using a portable air pump with filter.

SITE ENTRY PROCEDURES:

- ◆ Locate nearest available telephone.
- ◆ Confirm and post emergency telephone numbers and route to hospital.
- ◆ Designate at least one vehicle for emergency use.
- ◆ Determine wind direction and set up decontamination facilities. Decontamination facilities may be set up near the vehicle so that team members and equipment are decontaminated immediately prior to entering vehicle.



### WORK LIMITATIONS: (Time of day, etc.)

- ◆ No eating, drinking or smoking on-site, except in areas designated by the SSC.
- ◆ Buddy system will be used during performance of most work tasks.
- ◆ When preparing test plots, wet soil if it is dry before walking or working on them to reduce dust emissions.
- ◆ No working past 1/2 hour after sunset without proper lighting.

### DECONTAMINATION PROCEDURES:

#### Personnel:

Thoroughly wash hands and face with soap and water prior to each break.

Before getting into a vehicle, scrub boots with detergent and water rinse. Rinse splash gear with clean water to remove visible mud. Remove outer clothing (coveralls, jacket, splash gear etc.) and seal in a plastic bag. Do not shake out clothing as this may create a dust hazard. Wash hands and face. Outer clothing may be re-worn for other on-site activities, but must be laundered before being worn for other activities. At the end of each work day, and as soon as reaching home or hotel, shower and shampoo and seal all clothing worn on-site in plastic until it can be laundered. Do not store or wash site clothing with other clothes.

If a person becomes grossly contaminated (i.e. falls in the creek) decontaminate as much as possible on site and transport to the nearest shower facility for further decontamination.





### Sampling Equipment:

Wash all equipment which comes in contact with soil or water with trisodium phosphate or equivalent in water to remove visible dirt.

### Heavy Equipment:

Attempt to restrict vehicles to public right of ways. Vehicle decontamination not required.

Please Note: It is the responsibility of the Site Safety Coordinator to make sure that all pieces of equipment coming offsite are properly decontaminated according to the procedures outline above.

### Employee Training Requirements:

At the time of job assignment, all employees who will work on the Hughesville site shall receive a minimum of forty (40) hours of health and safety training. This training will be done to provide employees with the knowledge and skills necessary to perform their job assignments at a hazardous waste site with minimal risk to their safety and health. An additional three days of actual field work will be performed under the direct supervision of a trained and experienced supervisor at the time of job assignment.

Managers and supervisors directly responsible for hazardous waste site operators will receive eight (8) additional hours of specialized training on managing hazardous waste operations. Kathleen Smit will be responsible for overall site safety procedures. Ms. Smit will have received eight (8) additional hours of specialized training on managing hazardous waste operations.



### Medical Surveillance:

Medical examinations shall be performed prior to the time of job assignment for all employees who will work on the Hughesville Site. All field sampling personnel are currently participants in a medical surveillance program.

## VI. EMERGENCY INFORMATION

### LOCAL

Ambulance: 277-3333 - Belt

Hospitals: Columbus Hospital - 727-3333  
Great Falls

Montana Deaconess Medical Center - 761-1200  
Great Falls

Mountain View Memorial Hospital - 547-3321  
White Sulphur Springs

Poison Control Center: 1-800-525-5042

Sheriff: 727-6500 - Great Falls

Fire: 236-5385  
236-9949

Electric Company: Montana Power Company - 236-5521  
Monarch

Airport: Great Falls (See Map)



EMERGENCY ROUTES (see map attached to plan)

Occupational Physician:

Name: Dr. J. J. Maher, M.D.  
Phone: (406) 442-3570  
Address: Helena Family Physicians  
820 N. Montana  
Helena, MT 59601

Project Manager:

Name: Myles Grotbo  
Phone: (406) 443-5210

Client Contact:

Name: Susan McAnally  
Department of State Lands, Abandoned Mine Reclamation Bureau  
Phone: (406) 444-2074

Personnel Office:

Name: Laura Nordahl/Chen-Northern Inc.  
Phone: (406) 443-5210

Covered: Chen-Northern Inc. employees.

If any injury occurs, notify the injured person's personnel office as soon as possible after obtaining medical attention for the injured. Notification MUST be made within 24 hours of the injury.



VII. CONFINED SPACE ENTRY PROCEDURE

No confined space entry is permissible.

VIII. PLAN APPROVAL

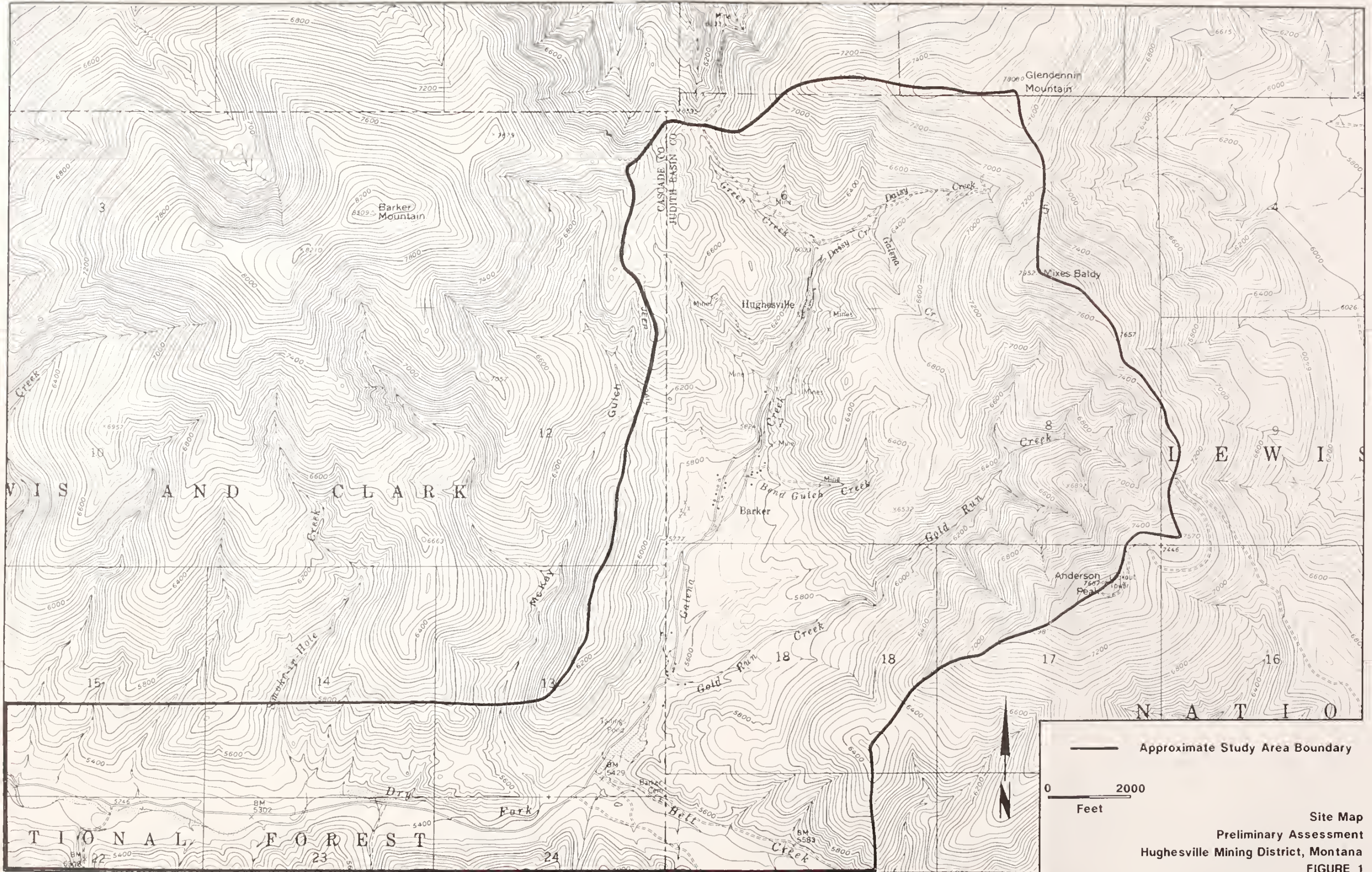
This Site Safety Plan has been written for the use of Chen-Northern Inc., its employees and subcontractors. Chen-Northern Inc. claims no responsibility for its use by others. The plan is written for the specific site conditions, purposes, dates and personnel specified and must be amended if these conditions change.

PLAN PREPARED BY: Daphne Sigurdakis DATE: 11/20/90

APPROVED BY: Kathleen A. Inuit DATE: 11/29/90



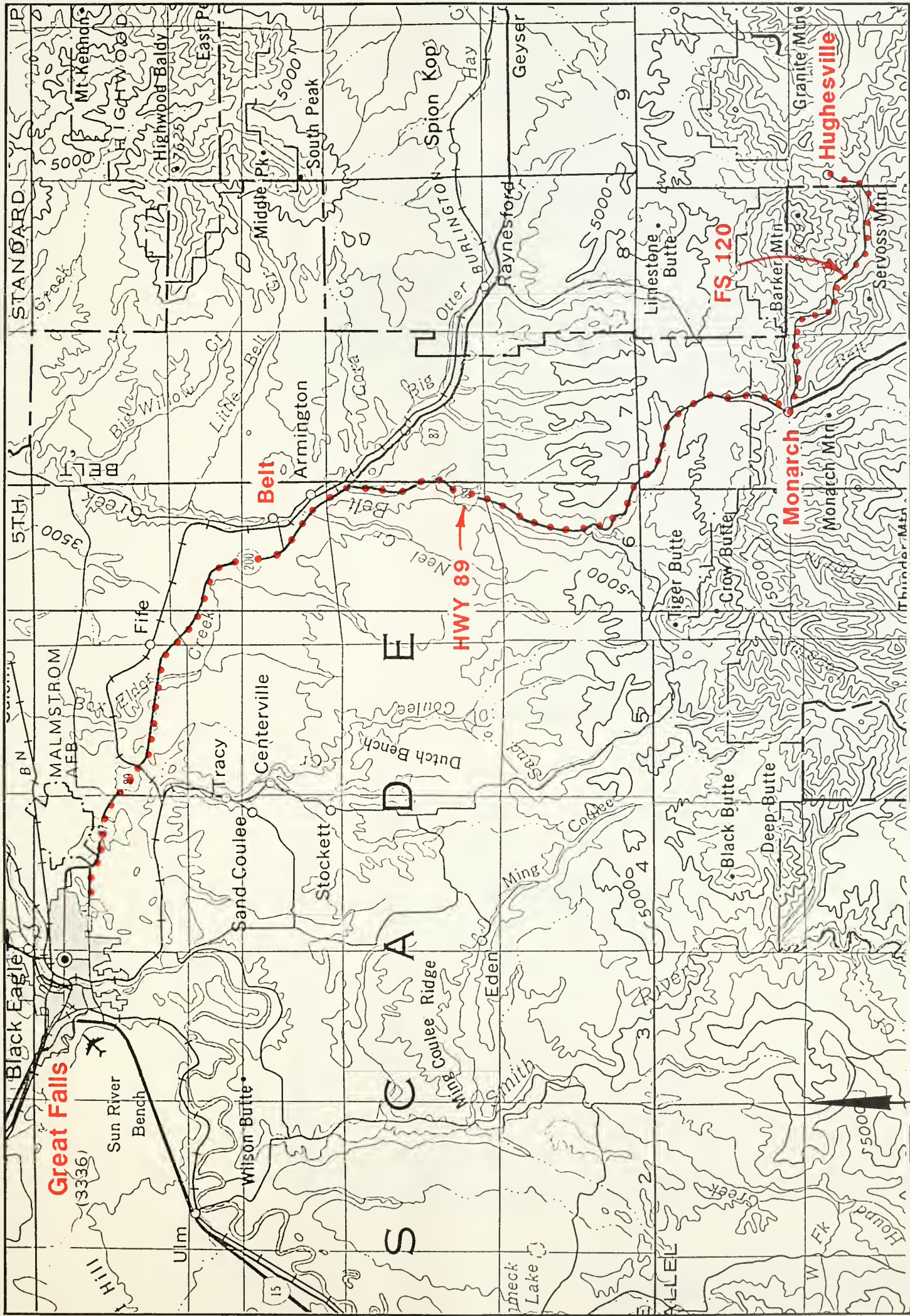




Site Map  
Preliminary Assessment  
Hughesville Mining District, Montana  
FIGURE 1



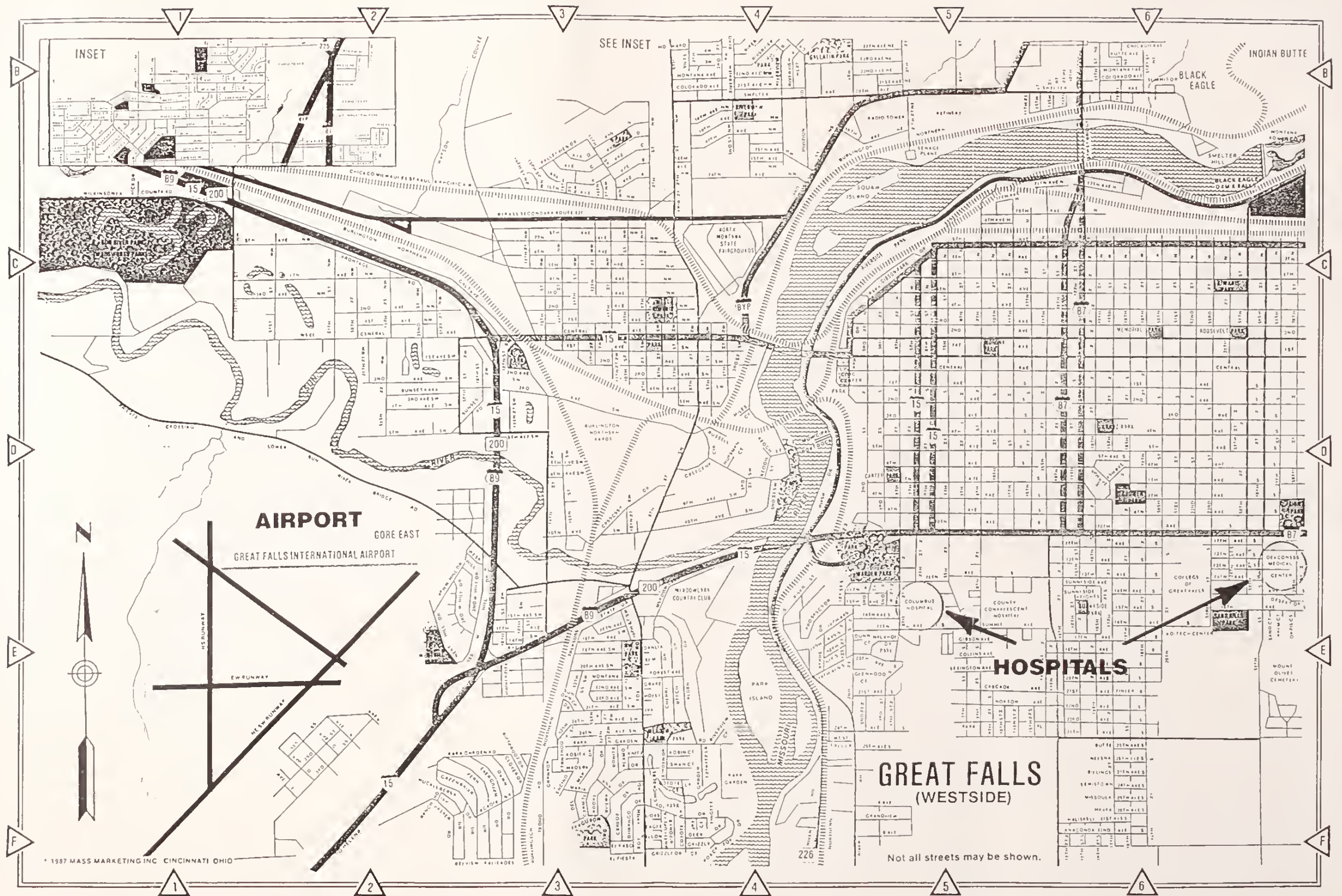




Emergency Route Map  
Hughesville Mining District, Montana  
FIGURE 2







Hospitals and Airport  
Hughesville Mining District, Montana  
FIGURE 3





